52. The method of claim 46, wherein each analyte comprises a probe specific for a compound of interest.

53. A system for conducting a multiplexed array experiment comprising

(a) a surface,

(b) a set of at least two microcarriers, each of the at least two microcarriers having an optically detectable code that distinguishes it from the other carrier, and each of the at least two microcarriers carrying an analyte that is identifiable by the respective code on the carrier, the at least two microcarriers being arbitrarily distributed on the surface,

(c) an imaging device configured to acquire at least one image of an examination site on the surface, both of the at least two microcarriers being viewable in the at least one image, and

(d) an image analysis system that uses code information from the image to interpret experiments on the analytes.--

REMARKS

The application was filed with 25 claims. In the Office action mailed on July 3, 2001, the Examiner restricted claims 1-25 into six groups as follows:

I. Claims 1-8, 20, and 25, drawn to a chemical library composition, classified for example in class 435, subclass 7.1 or other classes and subclasses, depending on the compounds in the library.

II. Claims 16 and 17, drawn to an array device, classified for example in class 435, subclass 7.1 or other classes and subclasses, depending on the compounds attached to the carriers.

III. Claims 18 and 19, drawn to a kit, classified in various classes and subclasses, depending on the compositions of the carriers and classes of carriers.

IV. Claims 9 and 10, drawn to a method of forming a library of determinable chemical compounds, classified, in class 435 and various subclasses, depending on the compositions of the compounds.

V. Claims 11-15 and 21 drawn to a method of detecting one or more target molecules capable of binding to one or more different, known library components, classified in class 435, subclass 4.

VI. claims 22-24, drawn to a method of multiplexing the detection and quantification of analytes, classified in class 435, subclass 4.

Additionally, the Examiner required an election of species for each group.

Applicants respond to the Office action by submitting new claims 26-53. New independent claims 26 and 53 are rewritten versions of claim 16 of Group II. New dependent claims 27-42 depend from claim 26. New independent claim 46 is directed to a method of conducting a multiplexed array experiment using a system such as the one recited in claim 26. Dependent claims 47-52 depend from independent claim 46. Support for the new claims can be found in the specification as follows: support for claim 26, 27, 46, and 53 can be found in Figures 4 and 5, and related description on pages 16 and 17 of the specification; support for claim 28 can be found on page 15, lines 22-27; support for

claim 29 can be found on page 22, lines 20-25; support for claim 30 can be found on page 13, lines 1-20; support for claim 31 can be found on page 13, line 21 to page 14, line 3; support for claim 32 can be found on page 2, lines 29-31, and in original claim 17; support for claims 33 and 34 can be found on page 20, lines 9-23; support for claims 35 and 36 can be found on page 20, lines 4-8; support for claim 37 can be found in Figure 4 and related text on page 16 of the specification; support for claims 38 and 51 can be found on page 13, claim 17 of U.S. Provisional Application Serial No. 60/170,947 filed December 15, 1999 and incorporated by reference in the subject application; support for claim 39 can be found on page 12, lines 8-31; support for claim 40 can be found on page 22, lines 20-23; support for claim 41 can be found on page 8, line 13 through page 9, line 22, and on page 15, lines 22-33; support for claims 42-44 can be found in Figures 10 and 11; support for claim 45 can be found on page 19, lines 4-5 and on page 10, lines 10-11; support for claim 47 can be found on page 11, line 1 to page 12, line 7; support for claims 48-50 can be found on page 20, lines 9-23; support for claim 52 can be found in Figure 4 and related description on page 16, line 25.

Applicants respond to the restriction requirement by electing the new claims for examination.

Regarding the election of species requirement, applicants treat the new claims as Invention II, and therefore respond to the election of species requirement in paragraph 11 of the Office action. Accordingly, applicants make the following species election: A) species of surface: glass; B) species of coded carriers: chips; C) species of how (the

manner in which) carries are coded: color coded; and D) species of different chemical compounds: nucleic acids.

Please contact applicants' undersigned attorney if there are any other issues to address prior to examination of the elected claims.

Respectfully submitted,

KOLISCH, HARTWELL, DICKINSON, McCORMACK & HEUSER

Pierre C. Van Rysselberghe
Registration No. 33,557
Customer No. 23581
of Attorneys for Applicant
520 S.W. Yamhill Street, Suite 200
Portland, Oregon 97204
Telephone: (503) 224-6655
Facsimile: (503) 295-6679

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box FEE AMENDMENT, Commissioner for Patents, Washington, D.C. 20231 on November 5, 2001.

Pamela A. Knight
Date of Signature: November 5, 2001

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PATENT TRADEMARK OFFICE

VERSION WITH MARKINGS TO SHOW CHANGES MADE

26. A system for conducting a multiplexed array experiment comprising

(a) a surface,

(b) a set of at least two carriers, each of the at least two carriers having an optically detectable code that distinguishes it from the other carrier, and each of the at least two carriers carrying an analyte that is identifiable by the respective code on the carrier, the at least two carriers being arbitrarily distributed on the surface,

(c) an imaging device configured to acquire at least one image of an examination site on the surface, both of the at least two carriers being viewable in the at least one image, and

(d) an image analysis system that uses code information from the image to interpret experiments on the analytes.

27. The system of claim 26 wherein the set includes three or more distinctively coded carriers.

28. The system of claim 26, wherein each of the at least two carriers has a colored code.

29. The system of claim 28, wherein the colored code includes at least two distinct colored optically identifiable marks.

30. The system of claim 26, wherein the carriers are formed from fiber optic components.

31. The system of claim 26, wherein the carriers include nanocrystals.

32. The system of claim 26, wherein the surface is glass.

33. The system of claim 26, wherein the imaging device acquires a digital image of the at least two carriers.

34. The system of claim 26, wherein the imaging device uses a CCD camera device to acquire the at least one digital image.

35. The system of claim 26, wherein the imaging device includes a microscope.

36. The system of claim 26, wherein the imaging device includes confocal optics structure.

37. The system of claim 26, wherein the analyte comprises nucleic acid.

38. The system of claim 26, wherein the analyte is selected from the group consisting of antibodies, enzymes, hormones, receptors, and inhibitors.

39. The system of claim 26, wherein the analyte comprises a molecular beacon compound.

40. The system of claim 26, wherein the code on each of the at least two carriers includes a distinctive spatial arrangement of optically identifiable marks.

41. The system of claim 26, wherein each optically identifiable mark is selected from a group of N possible colors, where N is greater than one.

42. The system of claim 26, wherein each carrier has an analyte area and a code display area.

43. The system of claim 42, wherein the analyte area and the code area substantially coincide.

44. The system of claim 42, wherein the analyte area and code at least partially overlap with each other.

45. The system of claim 26, wherein the carriers have a shape that is flat or cylindrical.

46. A method of conducting a multiplexed array experiment comprising

(a) providing a set of at least two carriers, each of the at least two carriers having an optically detectable code that distinguishes it from the other carrier, and each of the at least two carriers carrying an analyte that is identifiable by the respective code on the carrier, the at least two carriers being arbitrarily distributed on the surface,

(b) conducting an experiment on the analytes carried by the at least two carriers,

(c) distributing the at least two carriers on a surface,

(d) acquiring at least one image of an examination site on the surface, both of the at least two carriers being viewable in the at least one image, and

(e) using code information from the at least one image to interpret results of the experiment.

47. The method of claim 46, wherein the codes of the at least two carriers are detectable in the at least one image and further comprising

acquiring a second image showing an optically detectable result of the experiment on the analyte.

48. The method of claim 46, wherein the acquiring step includes the step of digitizing the at least one image.

49. The method of claim 46, wherein the acquiring step includes the step of using a CCD camera to generate the at least one image in digital form.

50. The method of claim 46, further comprising the step of analyzing the at least one image including correcting for background non-uniformity and thresholding at a level that separates carriers from background.

51. The method of claim 46, wherein the providing step includes selecting analytes from the group consisting of nucleic acid antibodies, enzymes, hormones, receptors, and inhibitors, and attaching the analytes to carriers in the set.

52. The method of claim 46, wherein each analyte comprises a probe specific for a compound of interest.

53. A system for conducting a multiplexed array experiment comprising

(a) a surface,

(b) a set of at least two microcarriers, each of the at least two microcarriers having an optically detectable code that distinguishes it from the other carrier, and each of the at least two microcarriers carrying an analyte that is identifiable by the respective code on the carrier, the at least two microcarriers being arbitrarily distributed on the surface,

(c) an imaging device configured to acquire at least one image of an examination site on the surface, both of the at least two microcarriers being viewable in the at least one image, and

(d) an image analysis system that uses code information from the image to interpret experiments on the analytes.